

Dear reviewer,

We sincerely appreciate your review of our manuscript and your constructive comments and suggestions. Your feedback will be very helpful in improving the clarity, structure, and overall quality of the manuscript.

**General comments:**

**In the manuscript by Iraheta et al. the authors present an optimized approach of obtaining water vapor samples for analysing the isotopic composition of water vapor. They performed systematic laboratory experiments initially for three different materials to test the effect of storage time, storage temperatures, and flow rates on tightness and isotopic stability of water vapor samples. To select the optimal container they defined ratings for each decision criterion, which resulted in a final score. With the identified optimal container further experiments were performed with three isotopically different waters, again testing and optimizing storage time, storage temperature and sampling flow rate.**

**The manuscript is well structured but it is far too long and contains largely redundant sections and figures, which makes it difficult to read. Also the discussion should be more focused, not repeating so many results. Manuscript lengths of Technical notes in other journals are sometimes limited to 7000 words - which is almost double for this manuscript.**

We appreciate this helpful and constructive feedback and agree that the manuscript would benefit from a more concise structure. During the editing significant shortening will be undertaken by reducing redundant sections, combining sections and simplifying the presentation of the results and discussion. To improve readability, figures will be discussed and carefully evaluated before removing or merging those, that provide repetitive information.

**My second concern is that the title is highly misleading. No water vapor sampling in trees and soils was conducted in this study. Water vapor was sampled from the headspace of 250 mL glass bottles, instead. Further, 'optimizing sampling protocols' promises somehow that several existing protocols which are used by the community could eventually be compared or optimized, which is not the case. The presented optimized method which the authors favor is more or less a follow up of two studies (Magh et al. (2022) and Havranek et al. (2021)) which also used glass bottles for vapor sampling. But in contrast to those studies, only data of water vapor sampling from glass bottles in lab experiments and no data of field applications were presented here.**

**I therefore recommend rephrasing the title and significantly shortening the manuscript.**

Thank you for raising this important point. We agree with the reviewer's comment; the current title could cause misunderstanding about the study's scope. Since this manuscript focuses on validating the optimization of the water vapor sampling method, the next manuscript will address the results of the field applications as well. We will revise the title to more accurately reflect the laboratory experimental approach used to

optimize the sampling method and avoid implying that it involves direct field sampling from trees or soil.

**Regarding the poor performance due to limited isotopic stability (L 549-551) of the 500 mL aluminum bags: I agree and I also guess there is a slight exchange at the zip-type seals (L 759-762) but this is probably the reason why the supplier recommends heat sealing! Maybe the results would have been significantly different with proper closed bags.**

In this study, we did not compare different sealing methods for aluminum bags. However, we agree that this is an important aspect to consider. Future studies would benefit from comparing sealing methods, such as zip-type seals versus heat seals, to assess whether this factor may limit the isotopic stability of water vapor samples. We acknowledge that differences in sealing methods could influence results and represent an interesting opportunity for further research.

#### **Specific Comments:**

**L 152 Figure 1: Blue and green lines are hard to distinguish, please change one of the colors.**

Thank you for pointing this out. We will modify the color scheme to improve the visual distinction between the lines

**L 205 Why 'Summary' here?**

We will revise this section to improve clarity and maintain consistency in the manuscript's structure.

**L 347 'bar' is not the correct unit for flow rate. Please change appropriately.**

Thank you for identifying this error. We will correct the unit.

**L 349 What is '1/8 PPT tubing'? 1/8 inch? or 1/8"? PTFE tubing? Please check.**

We will review the description to clearly specify the material and dimensions of the tubes.

**L 374-383 describes Fig. 4B, please add '(s. Fig 4B)' somewhere.**

Thank you for pointing that out. We will review the text to ensure the correct panel in the figure is clearly referenced.

**L 384-393 describes Fig. 4A, please add '(s. Fig 4A)' somewhere. Please swap these two sections so that it matches the order in the figure.**

Thanks for the suggestion. We will adjust the order of the sections in the text to match that of the figure.

**L 494-497 please delete – or does this information become relevant later?**

Thank you, we will review this section and delete or modify it as appropriate.

**L 525-527 This is already an interpretation of the results -> to discussion**

Thank you, we will move this interpretation to the discussion section.

**L 595 How was 'stable' defined?**

We will clarify and improve this section, but essentially, we observed that the isotopic plate during sampling at a flow rate of 100 or 125 ml/min remained on a single line, which is why we used the term "stable." This was in comparison to sampling flows of 35 and 75 ml/min.

**L 598 Can't find Fig. S4, do you mean Fig. S1? And where do you refer to Fig. S2 in the text?**

Thank you for pointing that out. We refer to Fig. S1. We will carefully check the references in the supplementary figures and correct them.

**Figure S1 Small differences can't be recognized due to the scaling of the y-axis for both isotopes. I suggest depicting d18-O from -5 to -25 and d2-H from -50 to -150‰.**

We will adjust the scale of the axes as you suggest to improve the visibility of small differences in isotopic values.

**Figure 9: Please add dashed lines at 0.0**

**Figure 10: Please add dashed lines at 0.0**

We will add dashed reference lines at 0.0 to improve the readability of the figure.

**Figure 10: Please change <sup>2</sup>D to <sup>2</sup>H**

We will introduce the change

**The data in Figure 11 are already shown in Fig. 9 and Fig. 10, correct? If so, please delete Fig. 11**

We will review the redundancy between the figures and remove Figure 11 if the information is already sufficiently represented in Figures 9 and 10.

**Figure 12: Could you perhaps include the information about the MAE in Fig. 9 and Fig. 10? If so, you could delete Fig. 12.**

Thank you very much for this suggestion. We will evaluate the possibility of incorporating the MAE information into Figures 9 and 10. If it is clearly visible, then we will remove Figure 12.

**L 965-971 Which parts of your approach are 'semi-in-situ'? Where did you show that 'it enables the capture of water vapor in equilibrium with soil and xylem'? Please rephrase.**

We agree that the wording may be confusing, as experiments were conducted only in the laboratory. We will revise this paragraph to make it clearer.

**Technical corrections:**

Thank you for identifying these technical and typographical issues. All suggested corrections will be incorporated into the revised manuscript.

**L 54 'a need' (blank is missing)**

We will add it

**L 87 and throughout the manuscript: no blank between number and %<sub>o</sub>**

We will add the space between the number and %<sub>o</sub>.

**L 135 Please delete 'Innovation.'**

Thank you, we will delete it.

**L 146 Please insert 'Table' before S1**

We will do it

**L 203 'words,' or 'words:' instead of 'words.'**

This is was typing mistake will be corrected

**L 281 Change 'Seven' to 'Six'**

We will do it

**L 411 "...equation 1 (Craig (1961); Coplen (2011)):"**

Thank you, we will correct it and review the bibliographical references.

**L 414 Two blanks are missing: 'where R<sub>sample</sub>' 'and R<sub>vsmow</sub>'**

We will add it

**L 414, 418, 428, 434: spacing between letters and superscripted numbers is too large**

Thank you, we will correct it and review the blanks in the manuscript

**Figure 5, Figure 6: change 'bag' to 'bags', to be consistent with 'bottles'**

We will do it

**Figure 6: error bars are missing**

We will add it

**L 611 IQR - define this acronym in the first instance**

We will define the acronym

**L 813 Please replace 'one-liter' by '1L' to be consistent**

We will make this correction and carefully review the manuscript

**L 822 Please insert 'vapor' before 'concentration'**

We will do it

**L 844 Please insert 'adsorptive' before 'isotope exchange'**

We will do it

**L 936 leorting?? ...the feasibility**

This is was typing mistake. We will correct it and revise the paragraph to improve clarity and comprehensibility.

**L 981 I suggest 'hot glue' instead of 'adhesivo termofusible'**

We will do it

**S1. List of materials: Refrigerator is probably 'Samsung' not 'Sansung'**

This is was typing mistake, we will correct it.